

# Defensible Digital Imaging (in the courtroom)

## Developing Standard Operating Procedures

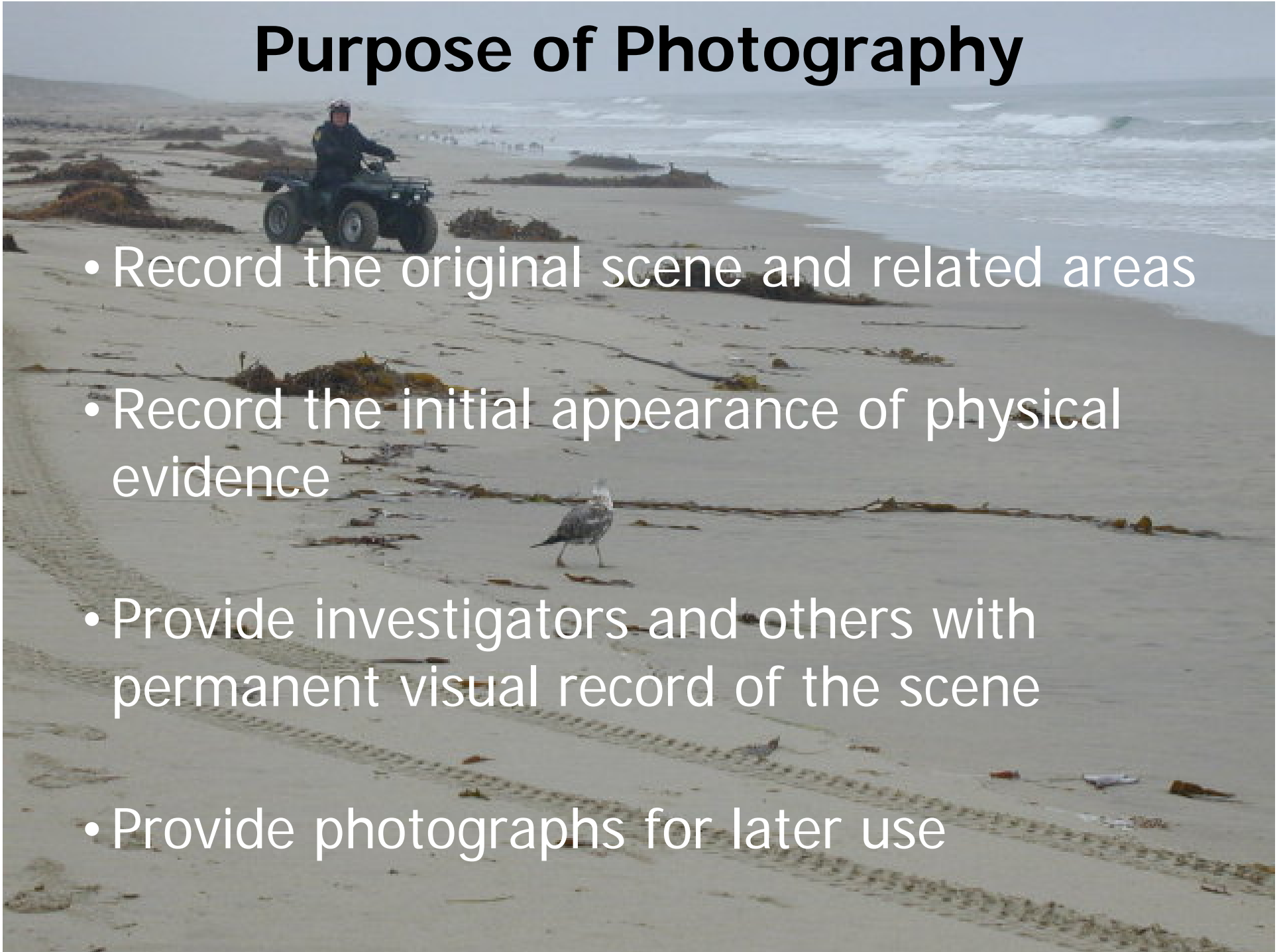
Randy Imai  
Staff Environmental Scientist  
Department of Fish and Game – OSPR

# REFERENCE SOURCES

1. **Institute for Forensic Imaging (IFI)**  
Indiana University Purdue University Indianapolis
2. **Scientific Working Group on Imaging Technology**
3. **Eastman Kodak Company**
4. **Staggs, Steven**  
Forensic Photography Instructor  
Author: Crime Scene and Evidence Photographer's Guide
5. **Steve Sawyer, John Holland & Ryan Todd**  
OSPR Legal Unit

# Purpose of Photography

- Record the original scene and related areas
- Record the initial appearance of physical evidence
- Provide investigators and others with permanent visual record of the scene
- Provide photographs for later use



# Type of Photographic Medium

- Video



- Silver Halide

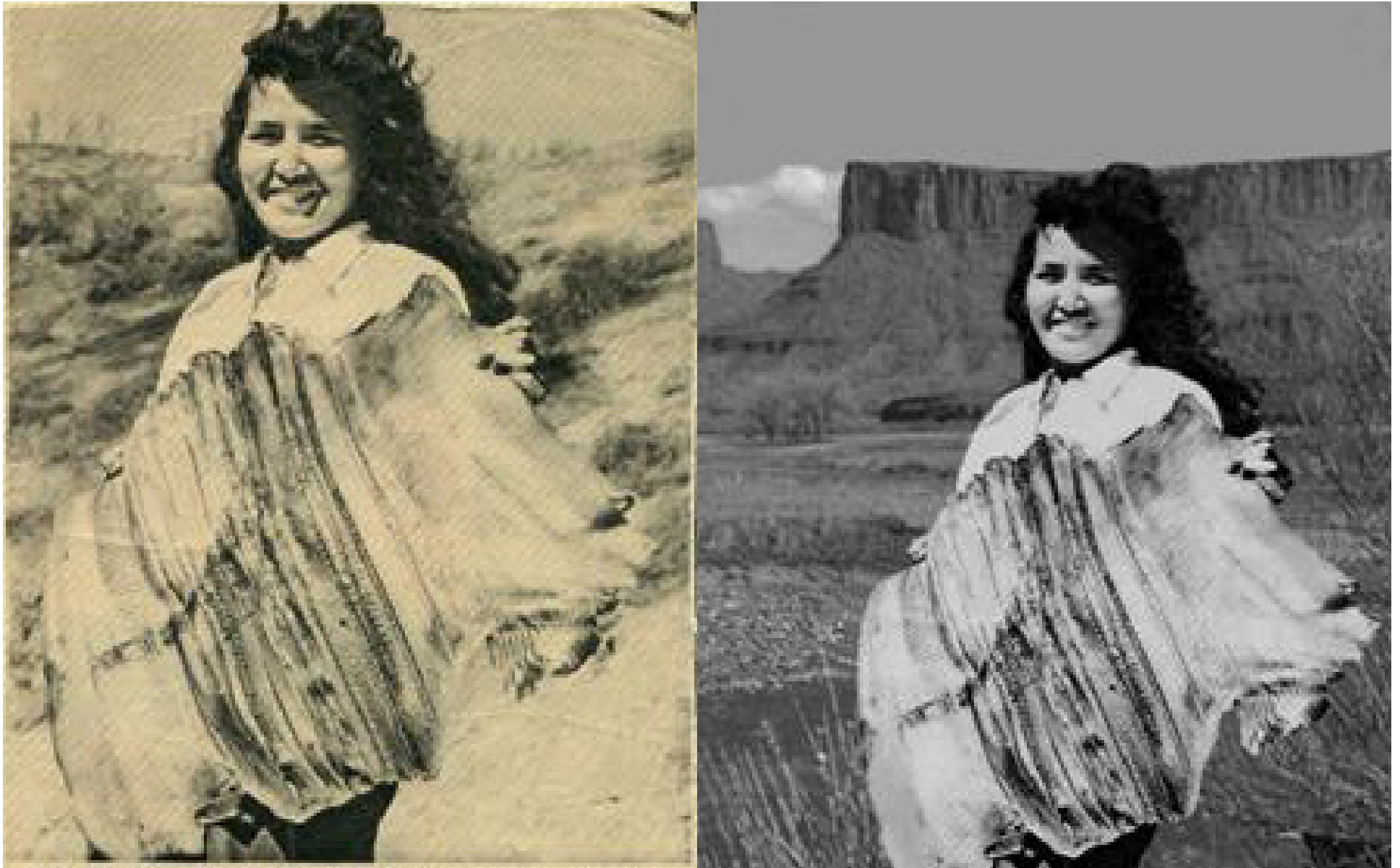


- Digital Camera



# Advantages of Digital Cameras

- Image Accessibility
  - Pictures are immediately available
  - Ability to review pictures prior to leaving scene
- Image Management
  - On-site image management
  - Operational security (all processing is in-house)
  - Reduce physical storage space for images
- Image Versatility
  - Share images electronically
  - Insert pictures in reports/word processors
  - Insert images in presentations and talks



This demonstrates private companies that specialize in digitally restoring old photographs and digitally manipulating old photographs.

Photos courtesy of Picture This Photo Restoration Studio (<http://www.picturefix.com/index.html>)

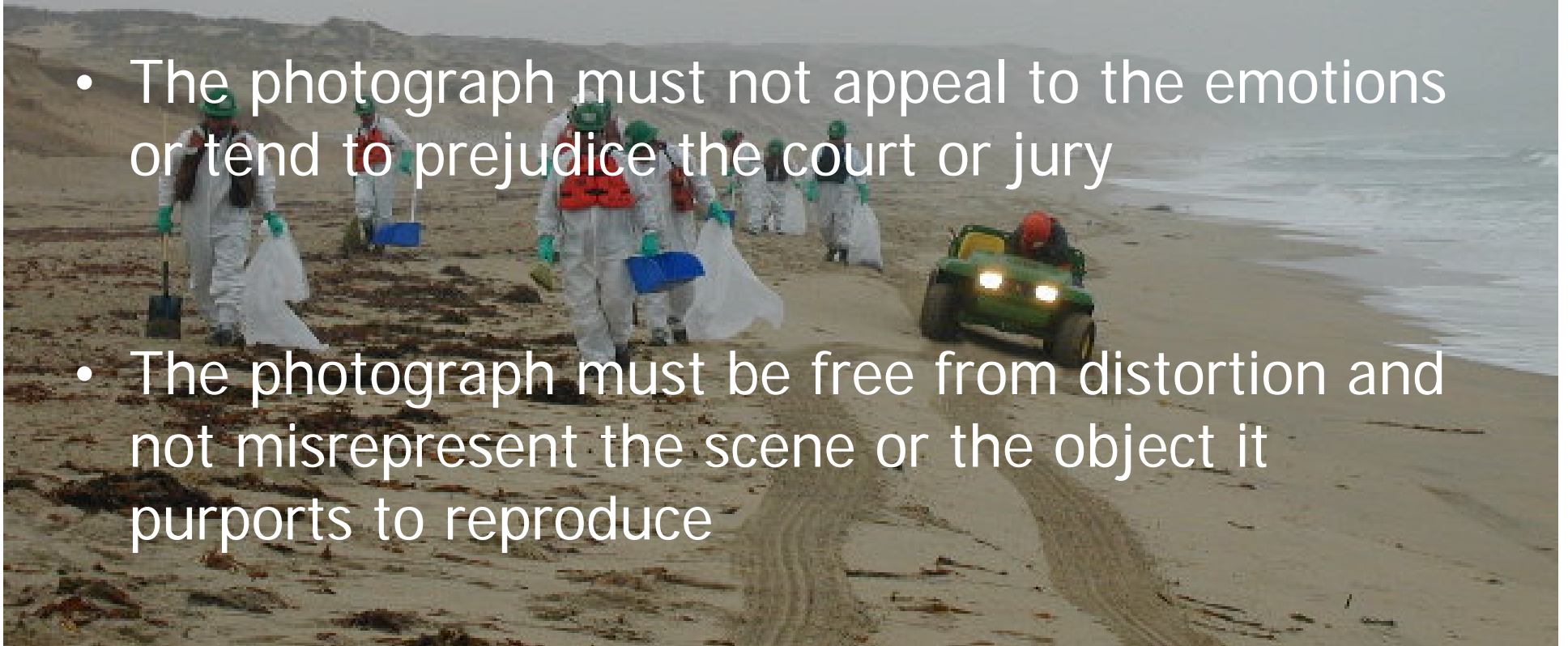
# California Evidence Code

## Section 1553

"A printed representation of images stored on a video or digital medium is presumed to be an accurate representation of the images it purports to represent. This presumption is a presumption affecting the burden of producing evidence. If a party to an action introduces evidence that a printed representation of images stored on a video or digital medium is inaccurate or unreliable, the party introducing the printed representation into evidence has the burden of proving, by a preponderance of evidence, that the printed representation is an accurate representation of the existence and content of the images that it purports to represent."

# Admissibility of Photographic Evidence

- Object pictured must be material or relevant to the point in issue
- The photograph must not appeal to the emotions or tend to prejudice the court or jury
- The photograph must be free from distortion and not misrepresent the scene or the object it purports to reproduce





# Digital Imagery in the Courtroom

Two Kinds of Images:

- Visually verifiable images -
- Analyzed images

Imagery Is Evidence

- Testimony of a witness lays the foundation for introduction of image as evidence
- Image is an exhibit to that testimony

# Digital Imagery in the Courtroom

## Two Kinds of Images:

- Visually verifiable images - Witness can answer the question "Is this a true and accurate representation?" Essentially the witness is saying, "I was there, I saw it, and it looked like this." The technology that produced the photo is not of interest, rather the testimony of the witness carries the weight.
- Analyzed images – When a witness or technician used specialized techniques to extract information that is not readily visible in the original scene, (i.e when measurements are taken)

# Admissibility

The court can rule three ways on the admissibility of digital photographs:

- No, it is not admissible

- Yes, it is admissible

- Yes, but with reduced weight

## Imagery Is Evidence

- Testimony of a witness lays the foundation for introduction of image as evidence

- Image is an exhibit to that testimony

## Admissibility Factors

- Evidence revolves around the integrity and veracity of the witness presenting the image who must demonstrate its authenticity to the court.

# Case Studies

## State of Washington vs. Eric Hayden, 1995

State of Washington: Murder of a missionary, fingerprints were digitally enhanced and defendant claimed image was manipulated to match the defendants fingerprint. However, no one on lab team had seen original prints therefore impossible for them to deliberately make them reflect a match. Also had an SOP in place and gave a courtroom demo.

## State of California vs. Phillip Lee Jackson, 1995

State of California: Charged with two murders and one attempted murder. Examiner was able to adjust color, brightness, contrast, and size. Digital images were admitted because even in conventional photo lab, processing as described was already a readily accepted practice in forensics photography.

In both cases, the use of the digital images were allowed to be used in the courtroom.



### Mumler's Spirit: 1869

P.T. Barnum hired a photographer to demonstrate the ease of manipulating photos (Lincoln's ghost)



### Cottingley Fairies: 1917

Famous English photograph later to be proven a hoax but had many people believing it as accurate



### 911-WTC: 2001

Hoax that was widely distributed on internet

# **Alleviating Suspicion in the Courtroom**

## **Develop Standard Operating Procedures (SOP)**

Purpose of a SOP is to ensure that all primary and original images are handled and processed in a manner consistent and relative to recommended practices (image capturing, image handling, image archiving, & image security)



Demonstrates why suspicion of digital photographs exist.  
Notice extent of oiling and placement of containment boom.



This only took about 15 minutes to manipulate without any special software.

Photoimaging software standard with the Windows operating system used to create the changes.



# Components of a SOP

- Purpose
- Equipment / Materials / Standards / Controls
- Procedures
- Calibration
- Limitations
- Safety
- References

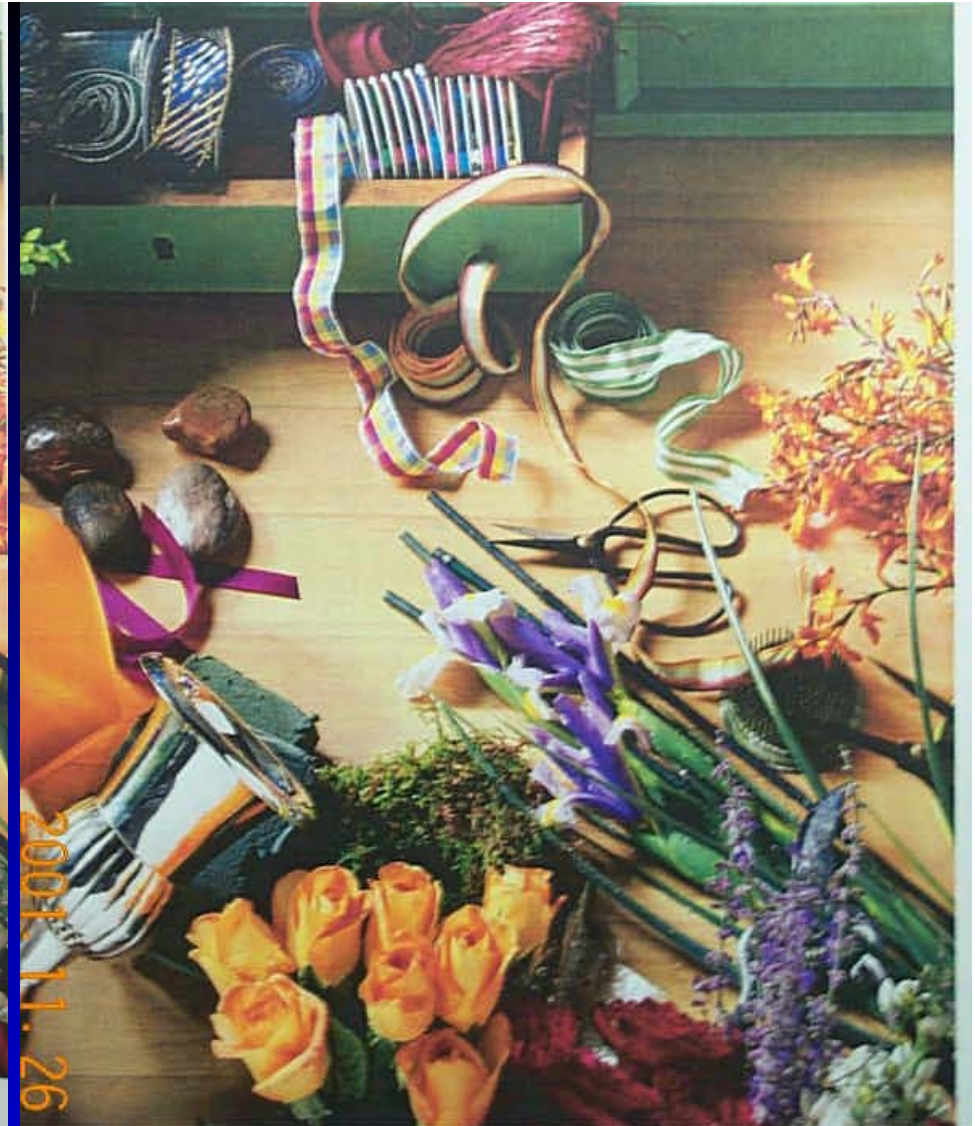
# If a Standard Operating Procedure is NOT in Place.....

**At the very least:**

1. Images should be recorded at the highest resolution (images can always be degraded from a high resolution photo to a low resolution photo (for sending through email, powerpoint presentations) but you can NOT upgrade a low resolution photo to a high resolution photo)



High Resolution Photograph



Low Resolution Photograph

Zoomed out, high and low resolution photographs may look similar and would be acceptable for general use.





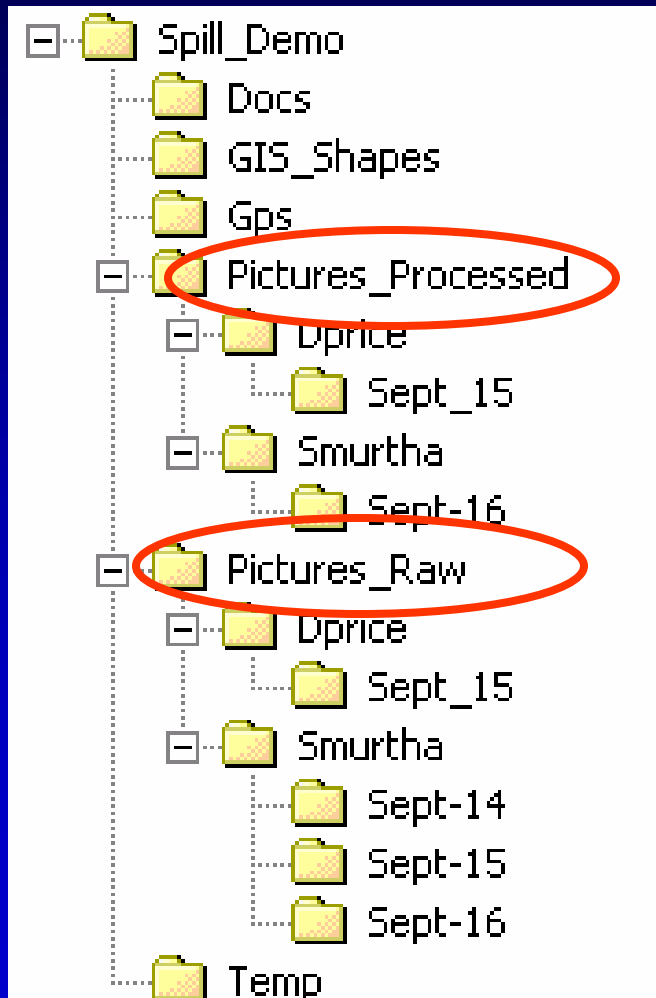
High Resolution Photograph

Low Resolution Photograph

Zoomed in, picture sharpness starts to degrade in low resolution images.

Using the powerpoint tool bar, zoom in the slides even more and you will quickly see rapid degradation of the image. The more you zoom in, the more pixilated the low resolution image will become.

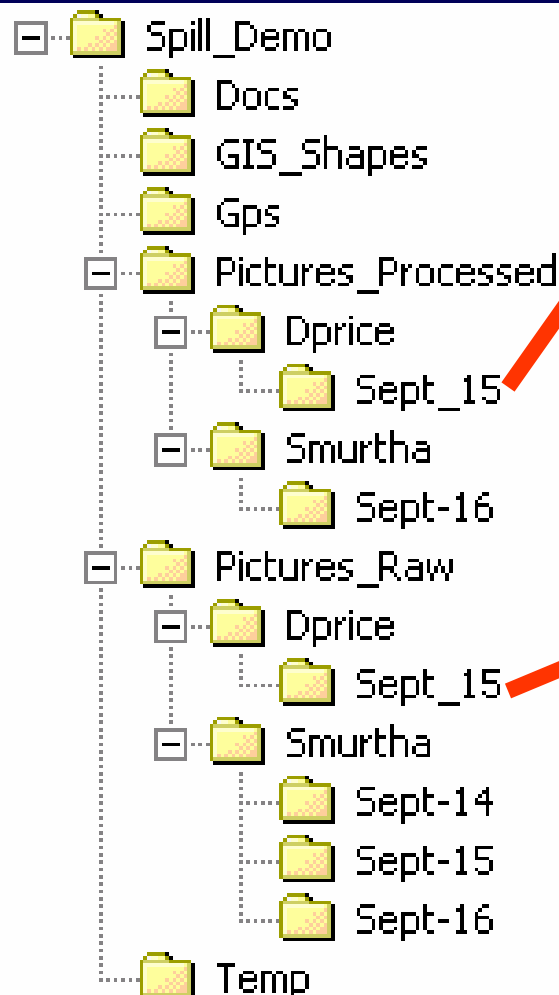
## 2. The agency must establish rigorous procedures for entering work in progress into proper file systems



Two subdirectories should be created:  
Raw subdirectory  
Processed subdirectory

All photos should go directly from the camera (or memory card) to the Raw subdirectory. Images in this subdirectory should NEVER be opened or manipulated.

Any photos that need to be viewed or manipulated should be copied to Processed subdirectory and only then can be opened.



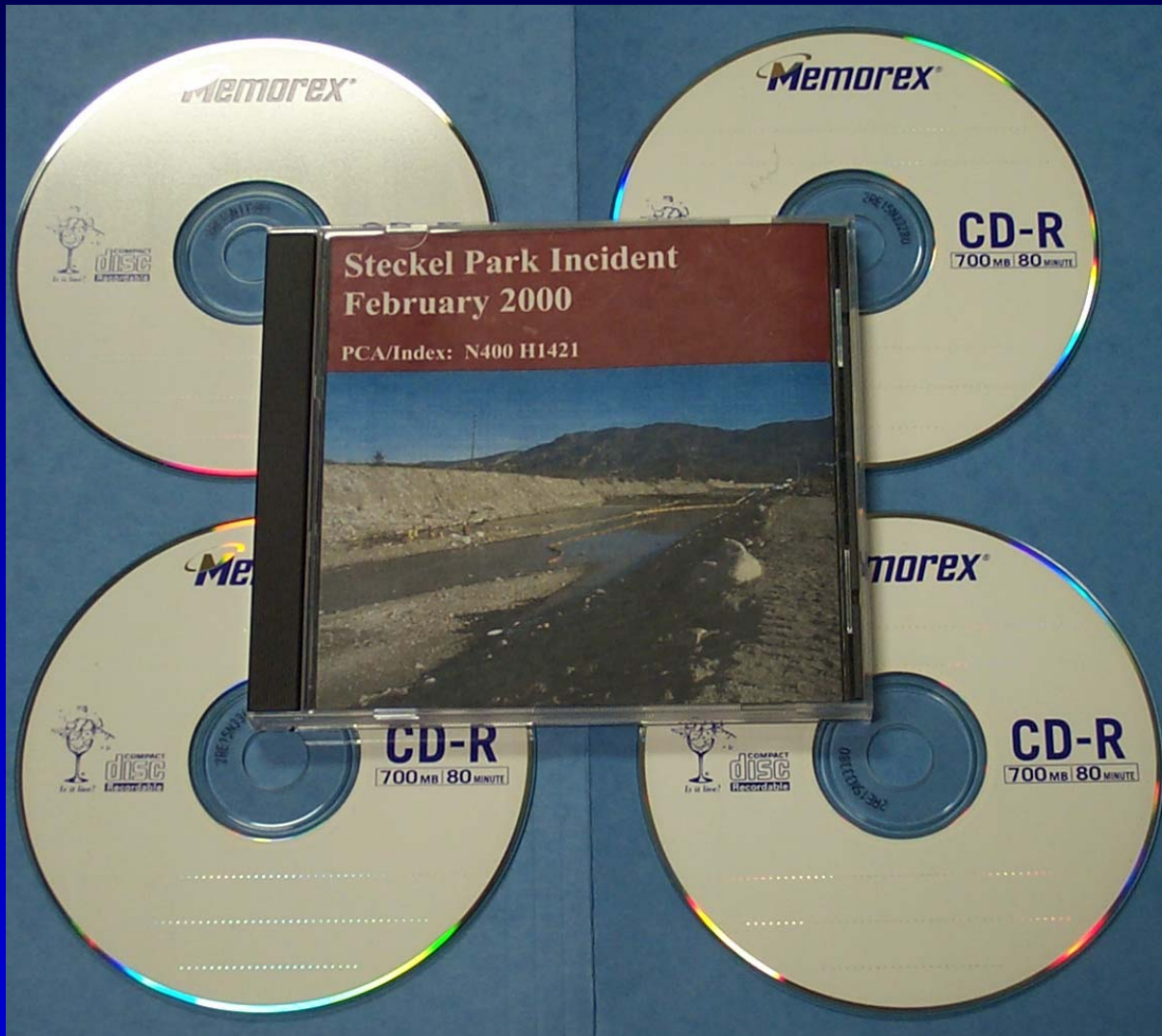
pathway	343 KB	JPEG Image	11/26/2001 8:51 AM
seal	285 KB	JPEG Image	11/26/2001 8:51 AM
workcrew	310 KB	JPEG Image	11/26/2001 8:52 AM

Processed photos opened, manipulated, and deleted.

P9140080	330 KB	JPEG Image	9/14/2001 6:27 AM
P9140081	354 KB	JPEG Image	9/14/2001 11:03 AM
P9140082	351 KB	JPEG Image	9/14/2001 12:51 PM
P9150083	428 KB	JPEG Image	9/15/2001 5:48 AM
P9150084	394 KB	JPEG Image	9/15/2001 5:48 AM
P9150085	386 KB	JPEG Image	9/15/2001 5:49 AM
P9150086	433 KB	JPEG Image	9/15/2001 5:49 AM
P9150087	431 KB	JPEG Image	9/15/2001 5:50 AM
P9150088	434 KB	JPEG Image	9/15/2001 6:20 AM
P9150089	434 KB	JPEG Image	9/15/2001 6:20 AM
P9150090	400 KB	JPEG Image	9/15/2001 6:21 AM
P9150091	410 KB	JPEG Image	9/15/2001 6:21 AM
P9150092	348 KB	JPEG Image	9/15/2001 6:21 AM
P9150093	361 KB	JPEG Image	9/15/2001 7:01 AM
P9150094	365 KB	JPEG Image	9/15/2001 7:02 AM
P9150095	333 KB	JPEG Image	9/15/2001 7:06 AM
P9150096	349 KB	JPEG Image	9/15/2001 7:06 AM
P9150097	319 KB	JPEG Image	9/15/2001 7:07 AM
P9150098	336 KB	JPEG Image	9/15/2001 7:33 AM
P9150099	347 KB	JPEG Image	9/15/2001 7:33 AM
P9150100	342 KB	JPEG Image	9/15/2001 7:33 AM
P9150101	318 KB	JPEG Image	9/15/2001 8:00 AM
P9150102	348 KB	JPEG Image	9/15/2001 8:04 AM
P9150103	347 KB	JPEG Image	9/15/2001 8:05 AM
P9150104	338 KB	JPEG Image	9/15/2001 8:06 AM
P9150105	349 KB	JPEG Image	9/15/2001 8:06 AM
P9150106	310 KB	JPEG Image	9/15/2001 8:11 AM
P9150107	395 KB	JPEG Image	9/15/2001 8:21 AM

Raw, untouched, unprocessed photos never to be opened or manipulated.

### 3. Images must be recorded in an unalterable, archival form soon after the records are created



- Transfer files to WORM CD (Write Once – Read Many).
- Files can not be erased or altered.
- Most CDs have serial numbers that can be used to track official version of photographs



## 4. Images should include information regarding their creation

### PHOTO LOG

Incident Name: Advanced Fuel Filtration Systems, Inc / E. Walker River

Photographer: Randy Imai  
DFG-OSPR

PHOTO NO.	DATE	COMMENTS
Dep00352.jpg	02/24/01	Dead Beaver. May have been from initial exposure because fur was easily remove. Fur sample taken.
Dep00353.jpg	02/24/01	Dead Beaver. May have been from initial exposure because fur was easily remove. Fur sample taken.
Dep00354.jpg	02/24/01	R. Imai with beaver, approx. 35lbs
Dep00355.jpg	02/24/01	Oiled roots overhanging from bank
Dep00356.jpg	02/24/01	Oiled roots overhanging from bank
Dep00357.jpg	02/24/01	Oil underneath willow branches
Dep00358.jpg	02/24/01	J. Hardwick taking pictures of willow branches
Dep00359.jpg	02/24/01	Tarball/sheens d/s sorbent/pompom boom
Dep00360.jpg	02/24/01	Sorbent/Pom-pom boom
Dep00361.jpg	02/24/01	Oil tarballs and sheen below sorbent/pompom boom



## 5. The agency must control custody of all image records at all times



# Control of Custody

- An individual should be assigned to be the photo historian. This ensures someone can testify about who had access to any images used to support testimony as evidence.
- Determine which computer or computers will be used for short, medium, or long term storage of image files.
- Password protect files/computer.
- Store in a secure location.
- Create a complete audit trail of how the computer files have been managed

6. All agency personnel who prepare exhibits for court should be trained in digital image processing and should understand which images might require a special notation to show that the changes are not prejudicial

# Tips for Digital Photographers

- Show One Subject Clearly
- Get Close
- Simplify the Background
- Observe the Light
- Hold the Camera Steady

# Tips for Videographers

- Start video with a brief introduction
  - Date
  - Time
  - Location
  - Description of the evidence viewed in the video tape
- Video tape the scene without any audio recording
- Begin taping with a general overview of the scene and surrounding area

## Tips for Videographers (continued)

- Continue throughout the scene using wide angle and closeup view to show the layout of the scene, location of evidence, and the relevance of evidence within the crime scene.
- Use slow camera movements such as panning and zooming

# Summary

- Your camera and the images you capture is a powerful tool.
- The images capture the essence of the extent of environmental impact.
- The images can be used as evidence in the California legal system.
- An approved implemented departmental Standard Operating Procedure will alleviate suspicion in the courtroom and provide a defensible form of evidence.
- Your reputation and the Department of Fish and Game's reputation is at stake!

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